

CLAIMS

1. A radiation curable waterborne composition comprising at least one amphiphilic dendritic polymer, at least one non-amphiphilic radiation curable oligomer or polymer and water and optionally at least one initiator initiating and/or promoting radiation, such as UV, IR or EB curing, and optionally at least one additional oligomer, polymer and/or monomer and/or optionally at least one additional component, such as a pigment, a filler, a diluent, such as a reactive diluent, and/or an additive, such as a neutralising, flow and/or levelling additive
characterised in, that said at least one amphiphilic dendritic polymer is built up from a polyhydric dendritic core polymer having at least 4 terminal hydroxyl groups and thus a hydroxyl functionality (f) of at least 4, such as 8, 16 or 32, and at least one monocarboxylic acid bonded to at least one and at most $f-1$ said terminal hydroxyl group(s) and at least one adduct, obtainable by addition of at least one monoalkylated polyethylene glycol to at least one dicarboxylic acid or at least one corresponding anhydride, bonded to at least one and at most $f-1$ said terminal hydroxyl group(s), and that said at least one non-amphiphilic radiation curable oligomer or polymer is at least one unsaturated polyester or polyether, at least one polyester or polyether acrylate, methacrylate or β -methyl acrylate, at least one acrylic, methacrylic or β -methyl acrylic modified fumarate ester or polyester, at least one urethane acrylate, methacrylate or β -methyl acrylate, at least one epoxy acrylate, methacrylate or β -methyl acrylate and/or at least one glycidyl acrylate, methacrylate or β -methyl acrylate.
2. radiation curable waterborne composition according to Claim 1
characterised in, that said amphiphilic dendritic polymer is a radiation curable.
3. A radiation curable waterborne composition according to Claim 1 or 2
characterised in, that said polyhydric dendritic core polymer is obtainable by addition of at least one di, tri or polyhydric monocarboxylic acid to a di, tri or polyhydric core molecule at a molar ratio yielding a polyhydric dendritic polymer comprising a core molecule and at least one branching generation bonded to said di, tri or polyhydric core molecule.
4. A radiation curable waterborne composition according to Claim 1 or 2
characterised in, that said polyhydric dendritic core polymer is obtainable by ring opening addition of at least one oxetane of a di, tri or polyhydric compound to a di, tri or polyhydric core molecule at a molar ratio yielding a polyhydric dendritic polymer comprising a core molecule and at least one branching generation bonded to said di, tri or polyhydric core molecule.

5. A radiation curable waterborne composition according to any of the Claims 1-4 characterised in, that said at least one monoalkylated polyethylene glycol has a molecular weight of at least 500, such as 500-2500 or 700-1500.
6. A radiation curable waterborne composition according to any of the Claims 1-5 characterised in, that said at least one monoalkylated polyethylene glycol is a monomethylated polyethylene glycol.
7. A radiation curable waterborne composition according to any of the Claims 1-6 characterised in, that said at least one dicarboxylic acid or anhydride is fumaric acid, maleic anhydride, succinic anhydride and/or glutaric acid.
8. A radiation curable waterborne composition according to any of the Claims 1-7 characterised in, that said at least one carboxylic acid is an aliphatic linear or branched saturated or unsaturated carboxylic acid having 8-24 carbon atoms in its main carbon chain.
9. A radiation curable waterborne composition according to Claim 8 characterised in, that said at least one monocarboxylic acid is lauric acid, tall oil fatty acid, soybean fatty acid, safflower fatty acid, sunflower fatty acid, cottonseed fatty acid, castor fatty acid, oleic acid, linoleic acid, linolenic acid stearic acid and/or isostearic acid.
10. A radiation curable waterborne composition according to Claim 8 or 9 characterised in, that said at least one monocarboxylic acid is a vinyl and/or allyl functional carboxylic acid.
11. A radiation curable waterborne composition according to Claim 10 characterised in, that said at least one monocarboxylic acid is acrylic, methacrylic and/or β -methyl acrylic acid.
12. A radiation curable waterborne composition according to any of the Claims 1-11 characterised in, a weight ratio said amphiphilic dendritic polymer to said non-amphiphilic radiation curable oligomer or polymer of between 1:99 and 99:1, such as 50:50, 10:90, 20:80, 70:30, 90:10, 80:20 or 70:30.
13. A radiation curable waterborne composition according to any of the Claims 1-12 characterised in, that said at least one unsaturated polyester or polyether, said polyester or polyether acrylate, methacrylate or β -methyl acrylate, said acrylic, methacrylic or β -methyl acrylic modified fumarate ester or polyester is a dendritic species thereof.

14. A radiation curable waterborne composition according to any of the Claims 1-13 characterised in, that said at least one initiator is at least one photoinitiator.
15. A radiation curable waterborne composition according to any of the Claims 1-14 characterised in, that said optional at least one initiator is a photoinitiator present in an amount of 0.1-5%, preferably 1-5%, by weight calculated on solid polymers, oligomers and monomers included or optional in said resin composition.
16. A radiation curable waterborne composition according to any of the Claims 1-15 characterised in, that said resin composition is a UV curable resin composition.
17. Use of an amphiphilic dendritic polymer according to any of the Claims 1-11, as water dispersing resin for a non-amphiphilic radiation curable oligomer or polymer.
18. Use according to Claim 17, wherein said non-amphiphilic radiation curable oligomer or polymer is an unsaturated polyester or polyether, a polyester or polyether acrylate, methacrylate or β -methyl acrylate, an acrylic, methacrylic or β -methyl acrylic modified fumarate ester, a urethane acrylate, methacrylate or β -methyl acrylate, epoxy acrylate, methacrylate or β -methyl acrylate and/or a glycidyl acrylate, methacrylate or β -methyl acrylate.
19. Use of an amphiphilic dendritic polymer according to any of the Claims 1-11 in a radiation curable coating or ink composition, such as a UV curable industrial coating or a UV curable printing ink.
20. Use of a waterborne radiation curable composition according to any of the Claims 1-16, in a waterborne radiation curable coating or ink composition, such as a UV curable industrial coating or a UV curable printing ink.